

SPRAY ASSESSMENT OF INSECTICIDE APPLICATIONS
AT INTERNATIONAL PAPER COMPANY ORCHARDS AT
SPRINGHILL, LOUISIANA, McNAIR, MISSISSIPPI, AND NACOGDOCHES, TEXAS

by

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INTRODUCTION

During November 1978, Neil Overgaard, Huey Wallace, and Stephen Covington visited the following International Paper Company orchards to evaluate spray application: the McNair Orchard, Mississippi, the Springhill Orchard, Louisiana, and the Nacogdoches Orchard, Texas. Howard Johnson, Charles Hudson, Gene Bobo, and other orchard personnel assisted Neil, Huey, and Stephen at their respective orchards.

The object of the evaluations was to assess the quantity of spray being applied, the coverage being obtained, and the droplet size of sprays currently being used at the orchards.

METHODS

At each orchard, the sprayer was first filled with water, and a given number of trees were sprayed in order to determine sprayer output in gallons per tree.

The sprayer was then filled with 100 gallons of water mixed with one-half pound of Rhodamine B x water soluble dye. Four soft drink cans wrapped with kromekote paper (a paper specially designed for measuring droplet size) were placed in each of two trees in the same row in each orchard. Two cans were placed each at the top, middle, and bottom of the trees. The sprayer was then driven past the sample trees at operational speed. The Hurricane sprayers used at McNair, Springhill, and Nacogdoches were driven past trees on one side. The span sprayer at the Nacogdoches Orchard was pulled past by both sides of each tree. Additional trial runs were made after necessary adjustments were made to the angle of the spray head of each sprayer.

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RESULTS

McNair Orchard

The McNair Orchard's sprayer delivered approximately 1 gallon per tree. During the first trial run, the angle of the spray head was tilted too low, so tops of trees were not being covered. The angle was raised during the next trial run and coverage was better; however, much of the spray was still directed to midcrown. In order to give a wider angle of distribution, the 9" diameter head was changed to a 5¼ x 22¼" rectangular head. The final trial run gave adequate coverage.

Springhill Orchard

The first trial run using the hurricane sprayer at the Springhill Orchard showed that the spray was being concentrated about midcrown on one side of the tree, and adequate coverage was not being obtained in the upper crown; therefore, the angle of the spray head was raised. It was also noted that the sprayer was blowing right through the tree to the next row so that much of the spray was being deposited on adjacent rows. Therefore, on subsequent trial runs, the sample row was sprayed directly on one side. The other side of the sample row was sprayed through the adjacent rows as is done operationally. Good spray deposits were found on all spray cards.

Nacogdoches Orchard

Two types of sprayers were tested at the Nacogdoches Orchard. One was a hurricane sprayer and the other was a span sprayer. The hurricane sprayer was tested using the system of spraying rows as outlined for the Springhill Orchard. Excellent coverage was obtained. The span sprayer was tested spraying two sides of a row. On the first two runs, the nozzles were clogged by the dye; however, when all nozzles were working and angles of the spray heads were adjusted upward, excellent coverage was obtained.

SUMMARY AND DISCUSSION

The amount of water applied per tree was approximately a gallon for each sprayer tested (table 1). This would be in line with the quantity of spray on the label for the low volume type of sprayer (1 - 2 gallons/tree of 30 pints of Guthion E.C. per 100 gallons of water).

All three orchards were using approximately 20 pints of Guthion 2L/100 gallons water. This is 10 pints below the registered rate and is inconsistent with label directions until March 31, 1979. Trees on the Nacogdoches Orchard (15 - 20 feet tall) were smaller than on the other two orchards (40 feet tall); therefore, these were probably getting sufficient quantities of insecticide. However, based on the chart in table 2, trees at the McNair and Springhill Orchards would not be receiving enough Guthion if the 20 pints/100 gallon rate were used; therefore, the rate should be increased to 30 pints/100 gallons of water.

Table 1. Sprayers evaluated for spray applications at International Paper Company Orchards,
November 1978

Orchard	Sprayer	Tractor MPH	Gal/Tree	Droplet VMD ^{1/}	Dosage Rate
McNair	Super Hurricane	2.3	1.0	510	20 pts/100 gals
Nacogdoches	Hurricane	3.5	1.0	680	20 pts/100 gals
Nacogdoches	Span Sprayer	3.5	1.0	570	20 pts/100 gals
Springhill	Super Hurricane	2.3	0.9	570	20 pts/100 gals

^{1/} VMD = Volume mean diameter

Table 2. Gallons of spray required per tree on seed orchard trees

Tree Species	No. trees sprayed	Average tree hgt. (ft) (range)	High volume drench gal/tree (range) (6 pts/100 gals)	Low volume mist/blower gal/tree 30 pts/100 gals (5x)
loblolly	8	28.6 (25-34)	3.78 (2.52-7.98)	0.76 (3/4)
shortleaf	5	23.6 (21-24)	2.56 (2.10-3.15)	0.51 (1/2)
loblolly	10	20.2 (18-23)	1.70 (1.47-2.39)	0.34 (1/3)
shortleaf	5	15.2 (13-18)	0.97 (0.63-1.68)	0.19 (1/4)

Merkel's Work

longleaf	55'		2.00
slash	40'	8	

Spray coverage was improved with minor adjustments in directing the head of the sprayers to the upper tree crown at the McNair and Springhill Orchards. The coverage being obtained was excellent at the Nacogdoches Orchard after slight adjustments of the spray heads.

Although the rate of application and coverage were not what they should be to the upper crown at McNair and Springhill, it does not fully explain the high loss due to coneworms experienced this last summer. All three orchards estimated loss of 20 - 25 percent due to coneworm attacks. This was despite five applications of Guthion and one application of Furadan. These losses are probably a conservative estimate since many coneworm damaged cones fall off before harvest. Although the loss was relatively high, it is not known what the loss would have been with no treatment, since there was no check used.

Other factors that may have been involved in lack of control may have been:

1. Lack of sufficient rainfall to wash Furadan into the soil
2. Late application of Furadan
3. Rainfall washing Guthion from foliage after application
4. Possible insect resistance to Guthion

RECOMMENDATIONS

1. Increase dosage rates of Guthion 2L to 30 pints/100 gallons water at all orchards.
2. Use a spreader stocker with the Guthion E.C.